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NATIONAL GEOLOGIC MAPPING REAUTHORIZATION ACT OF 2005

OCTOBER 27, 2005.—Ordered to be printed

Mr. DOMENICI, from the Committee on Energy and Natural Resources, submitted the following

R E P O R T

[To accompany S. 485]

The Committee on Energy and Natural Resources, to which was referred the bill (S. 485) to reauthorize and amend the National Geologic Mapping Act of 1992, having considered the same, reports favorably thereon without amendment and recommends that the bill do pass.

PURPOSE OF THE MEASURE

The purpose of S. 485 is to amend the National Geologic Mapping Act of 1992 to reauthorize the National Cooperative Geologic Mapping Program through 2010 and to make minor modifications to the program.

BACKGROUND AND NEED

The National Geologic Mapping Act of 1992 provides for a coordinated national geologic mapping program among Federal, State, and university programs. The program has served to prioritize the geologic mapping requirements of the Nation and to increase production of geologic maps. Under the program, the United States Geological Survey works in close partnership with the State geological surveys. This partnership has served to deliver modern geologic maps to Federal agencies, States, and communities through a program with three primary components.

The Federal component (FEDMAP) addresses issues crossing jurisdictional boundaries between States, serves the needs of Federal lands and Federal agencies, and leads to the development of new applications and processes. The State component (STATEMAP)

provides basic geologic information at a State level and is funded on a cost-share basis with the Federal share not to exceed 50 percent of the costs of the State component. The education component (EDMAP) provides for broad education in geologic mapping and field analysis and serves to ensure the adequate training of the next generation of geologic mappers.

A recent study conducted by the State of Kentucky concluded that the value of geologic maps to the State was in a range of $2.25 to $3.35 billion based on a mapping cost of $90 million. Reauthorizing the National Geologic Mapping Act through 2010 will provide for continued progress in achieving national mapping needs.

LEGISLATIVE HISTORY

S. 485 was introduced by Senators Craig, Bingaman and Bunning on March 1, 2005. A similar bill, H.R. 2362 was introduced by Representative Gibbons on May 16, 2005 and was passed by the House of Representatives on June 27, 2005. The bill was received in the Senate and referred to the Committee on Energy and Natural Resources. The Subcommittee on Public Lands and Forests held a hearing on S. 485 on March 8, 2005. At the business meeting on September 28, 2005, the Committee on Energy and Natural Resources ordered S. 485 favorably reported without amendment.

COMMITTEE RECOMMENDATION

The Committee on Energy and Natural Resources, in open business session on September 28, 2005, by a unanimous vote of a quorum present, recommends that the Senate pass S. 485.

SECTION-BY-SECTION ANALYSIS

Section 1 states the short title.

Section 2 amends section 2(a) of the National Geologic Mapping Act of 1992 which sets forth findings.

Section 3 amends section 2(b) of the National Geologic Mapping Act of 1992 which states the program purpose.

Section 4 amends section 4(b) of the National Geologic Mapping Act of 1992 to direct the Secretary of the Interior to develop a 5-year strategic plan for the mapping program and appoint an advisory committee and no later than 1 year after the date of enactment to provide biennial reports to the relevant Congressional Committees.

Section 5 makes technical corrections to section 4(c)(2) of the National Geologic Mapping Act of 1992.

Section 6 amends section 4(d)(1)(B)(ii) of the National Geologic Mapping Act of 1992 to include needs of land management agencies at the Department of the Interior as a consideration in setting mapping priorities under the Federal component of the program.

Section 7(a) amends section 5(a) of the National Geologic Mapping Act of 1992 by modifying the composition of the advisory committee.

Subsection (b) amends section 5(b) of the National Geologic Mapping Act of 1992 to add as a duty of the advisory committee scientific overview of geologic maps used or disseminated by Federal agencies for regulation or land-use planning.

Subsection (c) makes a conforming amendment.

Section 8 amends section 7(a) of the National Geologic Mapping Act of 1992 to provide that all maps developed with funding under the program shall be included in the national data base.

Section 9 amends section 8 of the National Geologic Mapping Act of 1992 to provide that a report be submitted not later than 3 years after the date of enactment and biennially thereafter.

Section 10 amends section 9 of the National Geologic Mapping Act of 1992 by authorizing up to $64 million per year through fiscal year 2010 for the implementation of the Act.

COST AND BUDGETARY CONSIDERATIONS

The following estimate of the cost of this measure has been provided by the Congressional Budget Office:

S. 485—National Geologic Mapping Reauthorization Act of 2005

Summary: S. 485 would reauthorize the national geologic mapping program and extend current deadlines for plans, reports, and other requirements established by the National Geologic Mapping Act of 1992. The bill would authorize appropriations for the program at the 2005 authorized level of $64 million for each of fiscal years 2006 through 2010. (Under current law, authorizations of appropriations for the program expired at the end of fiscal year 2005.) For 2006, $25 million has already been appropriated for this program. The geologic mapping program is carried out jointly by the U.S. Geological Survey (USGS) and state geological authorities. Under this program, federal and state geologists are developing a comprehensive geological map of the United States and a related database of environmental and scientific information.

Assuming appropriation of the authorized amounts, CBO estimates that carrying out the 1992 act, as amended by S. 485, would cost $2 million in fiscal year 2006 and $229 million over the 2006–2010 period. (We estimate that an additional $66 million would be spent after 2010.) Enacting this bill would have no effect on revenues or direct spending.

S. 485 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no costs on state, local, or tribal governments.

Estimated cost to the Federal Government: The estimated budgetary impact of S. 485 is shown in the following table. The costs of this legislation fall within budget function 300 (natural resources and environment). For this estimate, CBO assumes that the entire amounts authorized for the mapping program will be appropriated for each fiscal year. Estimated outlays are based on historical spending patterns for this program.

	By fiscal year, in millions of dollars—					
	2005	2006	2007	2008	2009	2010
Spending Under Current Law for the National Geologic Mapping Program:						
Budget Authority [1]	25	25	0	0	0	0
Estimated Outlays	25	19	8	0	0	0
Proposed Changes:						
Authorization Level	0	39	64	64	64	64
Estimated Outlays	0	2	35	64	64	64

	By fiscal year, in millions of dollars—					
	2005	2006	2007	2008	2009	2010
Spending Under S. 485 for the National Geologic Mapping Program:						
Authorization Level [1]	25	64	64	64	64	64
Estimated Outlays	25	21	43	64	64	64

[1] The 2005 and 2006 levels are the amounts appropriated to the USGS for those years under the National Geologic Mapping Act of 1992.

Intergovernmental and private-sector impact: S. 485 contains no intergovernmental or private-sector mandates as defined in UMRA and would impose no costs on state, local, or tribal governments.

Previous CBO estimate: On May 24, 2005, CBO transmitted a cost estimate for H.R. 2362, the National Geologic Mapping Reauthorization Act of 2005, as ordered reported by the House Committee on Resources on May 18, 2005. The two versions of the legislation are very similar. The cost estimate for S. 485 reflects the 2006 appropriation for this program.

Estimate prepared by: Federal costs: Deborah Reis; impact on state, local, and tribal governments: Marjorie Miller; impact on the private sector: Craig Cammarata.

Estimate approved by: Peter H. Fontaine, Deputy Assistant Director for Budget Analysis.

Regulatory Impact Evaluation

In compliance with paragraph 11(b) of rule XXVI of the Standing Rules of the Senate, the Committee makes the following evaluation of the regulatory impact which would be incurred in carrying out S. 485. The bill is not a regulatory measure in the sense of imposing Government-established standards or significant economic responsibilities on private individuals and businesses.

No personal information would be collected in administering the program. Therefore, there would be no impact on personal privacy.

Little, if any, additional paperwork would result from the enactment of S. 485, as ordered reported.

Executive Communications

Views of the Administration on S. 485 were set forth in testimony at the Subcommittee hearing as follows:

Statement of Chris Kearney, Deputy Assistant Secretary for Policy and International Affairs, U.S. Department of the Interior

Mr. Chairman, I am pleased to be here today to express the Administration's views on S. 485, a bill that would reauthorize the National Geologic Mapping Act of 1992. The Administration supports the reauthorization, but is concerned that the funding level proposed for reauthorization exceeds current appropriations by $38.8 million. Any additional funding for the National Cooperative Geologic Mapping program will have to compete with other priorities.

Throughout USGS history, geologic mapping has been one of our core capabilities. For state geological surveys, some founded even earlier than the USGS, geologic mapping has been an integral part of their history as well. A

map is the best and most understandable way of portraying a great variety of geologic information. The diversity of information produced by a geological map includes: the distribution of mineral, energy and ground water resources; presently active faults whose movements may cause devastating earthquakes; and the distribution of surficial deposits that form the substrate for wetlands and other ecologically diverse settings. Geologic maps and investigations assist in understanding the processes responsible for creating the natural hazards and can extend the knowledge of past events beyond the brief time for which human observations are available. This work is critical in assessing the extent, severity, and likelihood of future events. Wildfires can create conditions that intensify the potential for damage from landslides and excessive erosion in burned-over areas. Hurricanes, floods, and tsunamis leave traces of their destruction in the geologic record (through both erosion and sediment deposition), thereby allowing assessment of long-term risk. These insights can facilitate risk reduction through opportunities to limit damage and loss of life through the designs and placements of future structures. State Geological Surveys and the U.S. Geological Survey play vital advisory roles in such loss-reduction activities. They also aid others in identifying the vulnerability associated with existing structures, which is necessary to facilitate cost-effective mitigation efforts. Maps depicting site response to ground shaking provide essential background information for establishing building codes and defining mitigation strategies. The stakes are high because these hazards collectively cause tens of billions of dollars of annualized damage in the United States. Fortunately, much can be done to reduce the risks and lower the future damages. In the case of assessing the vulnerability of buildings, as in many others, mapping has yielded dividends far beyond its original intended goals.

When the 102nd Congress passed the National Geologic Mapping Act, it recognized that the USGS and the State geological surveys needed a coordinated program to prioritize the geologic mapping requirements of the Nation, and to increase the production of geologic maps. Geologic mapping has always been, and continues to be, a labor intensive exercise that involves field work to collect information; laboratory work to better understand the composition, properties and age of the materials collected; and the use of remote sensing to better extrapolate what has been learned in one location to a larger area. All of these aspects of geologic mapping cost money and require skilled practitioners. It becomes critically important for the USGS and the fifty State geological surveys to husband and leverage their resources. I can confidently tell you today that the National Cooperative Geologic Mapping Program has been extremely effective over the past 13 years doing exactly that. I would like to share some milestones of progress with you.

During the 13 years since passage of the Act, USGS and the State geological surveys have produced well over 7,500 new geologic maps. In 2004 alone, over 400 geologic maps and reports were published. Data in these maps cover a combined area of nearly 100,000 square miles. The high priority areas selected to map were determined by stakeholder groups, land management agencies, and state mapping advisory committees.

During the last 13 years geologic maps have been completed in National Parks, National Forests, and lands managed by BLM and other land-management agencies. To give one timely example, geologic maps of all four major National Forests in southern California were completed in the past year. These maps were put to good use by the Burned Area Emergency Response teams (BAER) that responded to the fires that devastated large areas between Los Angeles and San Diego. They are continuing to be used during the winter rainy season to predict where major debris flows, and or mud slides, might endanger the local communities.

In 1993, the first year after initial passage of the Act, 34 state geological surveys and the USGS participated in this program to produce new geologic maps. In 2004 the number of State geological surveys participating has grown to 47. In that first year, $1.2 million was distributed to the state surveys. Since 2001 over $6 million in federal funds has been matched annually by state survey dollars. Cumulatively, over the 13 years of the program, over $55 million has been distributed to 48 states, and these federal dollars were matched by state dollars.

In 1995 the education component of the program, EDMAP, was implemented to train the next generation of geologic mappers. This training component fills a gap generally not addressed through National Science Foundation grants and other mechanisms. In the first year of the program, fewer than 40 students received funds to do field work and learn how to construct a geologic map. Currently, over 550 university students from 120 universities across the Nation have received training. Initially, EDMAP only supported graduate students. In 2000, the decision was made to expand support to undergraduate students in the hope that this would positively influence their decision to continue in the Earth Sciences. We are presently in the process of surveying all former EDMAP recipients. I can report, from the information received to date, that this training program has been successful. Of those surveyed candidates that have responded, 100% of the Masters and Ph.D. candidates and 82% of the B.S. candidates have all continued in geoscience. These figures are above the national averages and attest to the strength of EDMAP.

In 1999 two economists from the Illinois State Geological Survey teamed up with the Kentucky Geological Survey to undertake a rigorous analysis of the economic benefits of detailed geologic mapping to Kentucky. Two conclusions

from this study are particularly worth mentioning. First, the total value of the geologic mapping program, at the minimum, is at least 25 times the cost of the program. Second, even though the bedrock geologic maps produced in Kentucky were originally created primarily for the coal industry, during the past 20 years these maps have been used by a wide array of users for everything from exploring for groundwater resources to planning cities to finding minerals.

Currently, USGS is in close coordination and agreement with the Association of American State Geologists (AASG) on this reauthorization bill and on associated geologic mapping issues. During the past year we have met to discuss the Act (PL. 106–148) frequently, and while we recommend a few changes which I will discuss in a moment, we feel that the National Geologic Mapping Act continues to serve the Nation very well and needs little revision. The Act was also reviewed by the Federal Advisory Committee to the National Cooperative Geologic Mapping Program last month, and my comments today incorporate their conclusions as well.

The principal changes in this reauthorization bill are: First, an increase from 48% to 50% of new funds, if appropriated, that will be made available for matching-funds grants to State geological surveys, second, an increase from 2% to 4% of new funds for matching-funds grants to Universities to train the next generation of geologic mappers, and third, keeping future authorization levels equal to the 2005 level in the present Act.

With the development of digital mapping technology and the Internet, geologic maps have become the most effective means of providing decision-makers and their geotechnical consultants with information that they need. All geologic maps being produced today under the auspices of the National Cooperative Geologic Mapping Program are digital, and each year more and more of these maps are being provided on the Internet. However, due to the labor intensive nature of producing geologic maps, a large percentage of the Nation has yet to be mapped. We are encouraged by this legislation to continue in this critical effort. With the development of digital mapping technology, geologic mapping is experiencing a renaissance in its use and applicability. During the past 13 years the USGS and the state geological surveys have worked together to implement the National Geologic Map Database, as called for in the Act. While this database provides a variety of tools and services, I would like to highlight just one—a catalog that provides information on almost every geologic map ever produced in the United States, and how anyone can obtain copies of the maps. This invaluable information spans 60,000 products.

In 2004, the American Geological Institute (AGI) published a new booklet entitled *Meeting Challenges with Geologic Maps*. The USGS, the Association of American State Geologists, the National Park Service, and the Geological

Society of America worked with AGI to produce this educational publication. It provides many excellent examples of how geologic maps are a public good and provide benefit to the Nation. This would not be happening without the National Geologic Mapping Act.

Mr. Chairman, in concluding my remarks, I would like to state that the National Geologic Mapping Act of 1992, and its subsequent reauthorizations, have been instrumental in helping focus attention on the Nation's need for a new generation of high-quality geologic maps. The Administration supports the reauthorization, but is concerned that the funding level proposed for reauthorization significantly exceeds current appropriations. Any additional funding for the National Cooperative Geologic mapping program will have to compete with other priorities.

Thank you, Mr. Chairman, for the opportunity to express the views of the Administration on the National Geologic Mapping Act. I would be happy to respond to any questions you may have.

CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill S. 485, as ordered reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italic, existing law in which no change is proposed is shown in roman):

National Geologic Mapping Act of 1990

[43 U.S.C. 31a]

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SEC. 2. FINDINGS AND PURPOSE.

(a) FINDINGS.—The Congress finds and declares that—

[(1) during the past 2 decades, the production of geologic maps has been drastically curtailed;]

(1) although significant progress has been made in the production of geologic maps since the establishment of the national cooperative geologic mapping program in 1992, no modern, digital, geologic map exists for approximately 75 percent of the United States;

(2) geologic maps are the primary data base for virtually all applied and basic earth-science investigations, including—

(A) exploration for and development of mineral, energy, and water resources;

(B) screening and characterizing sites for toxic and nuclear waste disposal;

(C) land use evaluation and planning for *Homeland and* environmental protection;

(D) earthquake hazards reduction;

(E) [predicting] *identifying* volcanic hazards;

(F) design and construction of infrastructure requirements such as utility lifelines, transportation corridors, and surface-water impoundments;

(G) reducing losses from landslides and other ground failures;

(H) mitigating effects of coastal and stream erosion;

(I) siting of critical facilities; [and]

(J) recreation and public awareness; and

[(J)] *(K)* basic earth-science research;

(3) Federal agencies, State and local governments, private industry, and the general public depend on the information provided by geologic maps to determine the extent of potential environmental damage before embarking on projects that could lead to preventable, costly environmental problems or litigation;

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(9) advances in digital technology and geographical information system science have made geologic map databases increasingly [important] *available* as decision support tools for land and resource management; and

(10) a comprehensive nationwide program of geologic mapping of surficial and bedrock deposits is required in order to systematically build the Nation's geologic-map data base at a pace that responds to increasing demand.

(b) PURPOSE.—The purpose of this Act is to expedite the production of a geologic-map data base for the Nation, to be located within the United States Geological Survey, which can be applied to land-use management, assessment, and utilization, conservation of natural resources, groundwater management, and environmental protection *and management*.

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SEC. 4. GEOLOGIC MAPPING PROGRAM.

(a) ESTABLISHMENT.—

(1) IN GENERAL.—There is established a national cooperative geologic mapping program between the United States Geological Survey and the State geological surveys, acting through the Association.

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(b) RESPONSIBILITIES OF THE SURVEY.—

(1) LEAD AGENCY.—The Survey shall be the lead Federal agency responsible for planning, developing national priorities and standards for, coordinating, and managing the geologic mapping program. In carrying out this paragraph, the Secretary, acting through the Director, shall—

(A) develop a 5-year strategic plan for the geologic mapping program in accordance with section 6, which plan shall be submitted to the Committee on Resources of the House of Representatives and the Committee on Energy and Natural Resources of the Senate [not later than 1 year after December 9, 1999;] *not later than 1 year after the date of enactment of the National Geologic Mapping Reauthorization Act of 2005;';*

(B) appoint with the advice and consultation of the Association, the advisory committee [not later than 1 year after December 9, 1999, in accordance] *not later than 1 year after the date of enactment of the National Geologic*

Mapping Reauthorization Act of 2005 in accordance with section 5; and

(C) [not later than 3 years after December 9, 1999, and biennially thereafter, submit] *submit biennially* a report to the Committee on Energy and Natural Resources of the United States Senate and to the Committee on Resources of the House of Representatives identifying—

* * * * * * *

(c) PROGRAM OBJECTIVES.—The objectives of the geologic mapping program shall include—

(1) determining the Nation's geologic framework through systematic development of geologic maps at scales appropriate to the geologic setting and the perceived applications, such maps to be contributed to the national geologic map data base;

(2) development of a complementary national [geophysical-map data base, geochemical-map data base, and a] geochronologic and paleontologic data base that [provide] *provides* value-added descriptive and interpretative information to the geologic-map data base;

(3) application of cost-effective mapping techniques that assemble, produce, translate and disseminate geologic-map information and that render such information of greater application and benefit to the public; and

(4) development of public awareness of the role and application of geologic-map information to the resolution of national issues of land use management.

(d) PROGRAM COMPONENTS.—

(1) FEDERAL COMPONENT.—

(A) IN GENERAL.—The geologic mapping program shall include a Federal geologic mapping component, the objective of which shall be to determine the geologic framework of areas determined to be vital to the economic, social, environmental, or scientific welfare of the United States.

(B) MAPPING PRIORITIES.—For the Federal component, mapping priorities—

(i) shall be described in the 5-year plan under section 31e of this title; and

(ii) shall be based on—

(I) national requirements for geologic map information in areas of multiple-issue need or areas of compelling single-issue need; [and]

(II) national requirements for geologic map information in areas where mapping is required to solve critical earth science problems[.]*; and*

(III) the needs of land management agencies of the Department of the Interior.

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SEC. 5. ADVISORY COMMITTEE.

(a) ESTABLISHMENT.—

(1) IN GENERAL.—There shall be established a [10-member] *11-member* geologic mapping advisory committee to advise the Director on planning and implementation of the geologic mapping program.

(2) MEMBERS EX OFFICIO.—Federal agency members shall include the Administrator of the Environmental Protection Agency or a designee, *the Secretary of the Interior or a designee from a land management agency of the Department of the Interior,* the Secretary of Energy or a designee, *and* the Secretary of Agriculture or a designee[, and the Assistant to the President for Science and Technology or a designee].

(3) APPOINTED MEMBERS.—[Not later than 1 year after December 9, 1999, in consultation] *In consultation* with the Association, the Secretary shall appoint to the advisory committee two representatives from the Survey (including the [Chief Geologist, as Chairman] *Associate Director for Geology, as Chair*), two representatives from the State geological surveys, one representative from academia, [and one representative from the private sector] *2 representatives from the private sector*.

(b) DUTIES.—The advisory committee shall—

(1) review and update the 5-year plan prepared by the Director pursuant to section 6;

(2) review the scientific progress of the geologic mapping program; [and]

(3) provide a scientific overview of geologic maps (including maps of geologic-based hazards) used or disseminated by Federal agencies for regulation or land-use planning; and

[(3)] *(4)* submit an annual report to the Secretary that evaluates the progress of the Federal, State, and university mapping activities and evaluates the progress made toward fulfilling the purposes of section 4–7.

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SEC. 7. NATIONAL GEOLOGIC MAP DATABASE.

(a) ESTABLISHMENT.—

(1) IN GENERAL.—The Survey shall establish a national [geologic map] *geologic-map* database.

(2) FUNCTION.—The database shall serve as a national catalog and archive, distributed through links to Federal and State geologic map holdings, that includes—

[(A) all maps developed under the Federal component and the education component;]

(A) all maps developed with funding provided by the National Cooperative Geologic Mapping Program, including under the Federal, State, and education components;

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SEC. 8. BIENNIAL REPORT.

[Not later than 3 years after December 9, 1999, and biennially] *Not later than 3 years after the date of enactment of the National Geologic Mapping Reauthorized Act of 2005 and biennially* thereafter, the Secretary shall submit to the Committee on Resources of the House of Representatives and the Committee on Energy and Natural Resources of the Senate a report that—

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SEC. 9. AUTHORIZATION OF APPROPRIATIONS.

[(a) IN GENERAL.—There are authorized to be appropriated to carry out sections 31a to 31h of this title—

[(1) $28,000,000 for fiscal year 1999;
[(2) $30,000,000 for fiscal year 2000;
[(3) $37,000,000 for fiscal year 2001;
[(4) $43,000,000 for fiscal year 2002;
[(5) $50,000,000 for fiscal year 2003;
[(6) $57,000,000 for fiscal year 2004; and
[(7) $64,000,000 for fiscal year 2005.]

(a) IN GENERAL—There is authorized to be appropriated to carry out this Act $64,000,000 for each of fiscal years 2006 through 2010.

(b) ALLOCATION OF APPROPRIATIONS.—Of any amounts appropriated for any fiscal year in excess of the amount appropriated for fiscal year [2000] *2005*—

(1) [48] *50* percent shall be available for the State component; and

(2) [2] *4* percent shall be available for the education component.

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